Supplement to the article: *Hybrid Ensemble-Based Travel Mode Prediction*

1 Global ranking

Table 1 illustrates the comprehensive ranking of methods. Across the 9 data streams, all 38 methods were organized based on their F_1 macro scores in descending order. Subsequently, we computed the *Ranking score* for each method by computing their average ranking position across these nine rankings. The ultimate *Ranking position* represents the sequential number of these averages, sorted from the smallest to the nearest value.

Table 1: Table with the global ranking of used methods

Ranking position	Method abbr.	Ranking score	Ranking position	Method abbr.	Ranking score
1	DS-RF	4.33	20	DT B2	19.56
2	WV-RF	5.78	21	DT B1	21.67
3	DS-LGBM	7.78	22	LR B2	22.11
4	RF S3	8.11	23	RF B2	23.11
5	DS-BATCH	8.44	24	LGBM B2	25.00
6	WV-LGBM	9.00	25	LR B1	25.11
7	RF S1	9.00	26	WV-ONLINE	25.44
8	LR S3	9.78	27	SRP	26.22
9	DT S1	9.83	28	RF B1	26.33
10	DT S3	10.28	29	DS-ONLINE	26.78
11	LR S1	10.33	30	NB S1	30.44
12	WV-BATCH	10.83	31	HAT	30.78
13	LGBM S3	12.39	32	NB S3	31.22
14	LGBM S1	12.56	33	NB B2	31.78
15	RF S2	13.06	34	ARF	32.00
16	LGBM S2	13.28	35	NB S2	32.50
17	LR S2	14.00	36	NB B1	34.39
18	DT S2	16.39	37	ONB	35.56
19	LGBM B1	18.61	38	OLR	37.22

2 Data stream preparation

If any of the nine data streams included variables related to the date and time of the journey, the instances were arranged chronologically. In each original data stream, we removed variables that might lead to knowledge leakage and conducted one-hot encoding for categorical variables. The datasets had minimal missing values, and for categorical variables, we converted these to a category indicating *'Don't know / Refuse to answer'*. Numerical missing values were replaced with the mode value computed across the entire dataset. Instances with missing target values were excluded.

3 Online and batch learning models configuration

All batch learning models were initialized with their default hyperparameter values, except for setting the *random_seed* to 42 where applicable. Within Listings 1 to 5, you'll find code snippets that define online learning models using the River library.

```python
from river.linear_model import LogisticRegression as LROnline
from river import compose
from river.preprocessing import StandardScaler
from river import optim

lr_online = compose.Pipeline(
    StandardScaler(
        with_std=True
    ),
    LROnline(
        optimizer=optim.SGD(
            lr=0.005
        ),
        loss=optim.losses.Log(
            weight_pos=1.,
            weight_neg=1.
        ),
        l2=1.0,
        l1=0.,
        intercept_init=0.,
        intercept_lr=0.01,
        clip_gradient=1e+12,
        initializer=optim.initializers.Zeros()
    )
)
```

Listing 1: Online Logistic Regression (OLR) model definition.

```python
from river import forest

arf = forest.ARFClassifier(seed=42, leaf_prediction="mc")
```

Listing 2: Adaptive Random Forest (ARF) model definition.

```python
from river.tree import HoeffdingAdaptiveTreeClassifier

hat = HoeffdingAdaptiveTreeClassifier(
    grace_period=100,
    delta=0.01,
    leaf_prediction='nb',
    nb_threshold=10,
    seed=42
)
```

Listing 3: Hoeffding Adaptive Tree (HAT) model definition.

```python
from river.tree import HoeffdingTreeClassifier
from river import ensemble

base_model = HoeffdingTreeClassifier(grace_period=100, delta=0.01)
srp_model = ensemble.SRPClassifier(model=base_model, n_models=3, seed=42)
```

Listing 4: Streaming Random Patches (SRP) model definition.

```python
from river.naive_bayes import GaussianNB as GNBOnline

nb_online = GNBOnline()
```

Listing 5: Online Gaussian Naive Bayes (ONB) model definition.

4 Detailed results

Within Table 2, you'll find a comprehensive breakdown of experiment outcomes across various data streams. The rows are arranged based on both the data stream and F_1 macro score. For ensembles, the presented drift/replacement values represent the aggregated sum across all ensemble members. Additionally, with respect to both online and baseline methods, the count of drifts and replacements is zero since these methods do not utilize our monitoring and retraining strategies. Figure 1 presents the F_1 macro score values for selected methods on all data streams. The data streams were arranged in order based on the increasing number of features.

Table 2: Table with detailed results for all experiments

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
0	London	3	DS-LGBM	0.5492	0.7347	0.5830	45.0	17.0	1083.41
1	London	6	WV-LGBM	0.5464	0.7339	0.5838	45.0	17.0	1045.94
2	London	2	WV-RF	0.5455	0.7317	0.5804	54.0	20.0	5789.70
3	London	1	DS-RF	0.5445	0.7331	0.5795	54.0	20.0	5778.41
4	London	5	DS-BATCH	0.5378	0.7198	0.5633	22.0	11.0	583.30
5	London	14	LGBM S1	0.5332	0.7157	0.5580	15.0	8.0	143.40
6	London	13	LGBM S3	0.5331	0.7180	0.5606	6.0	2.0	125.21
7	London	16	LGBM S2	0.5324	0.7144	0.5552	1.0	1.0	100.41
8	London	12	WV-BATCH	0.5306	0.7151	0.5561	22.0	11.0	499.85
9	London	4	RF S3	0.5303	0.7156	0.5578	6.0	1.0	1608.12
10	London	11	LR S1	0.5299	0.6943	0.5312	14.0	9.0	149.13
11	London	7	RF S1	0.5281	0.7137	0.5532	14.0	9.0	1579.17
12	London	8	LR S3	0.5274	0.7065	0.5446	8.0	2.0	158.33
13	London	17	LR S2	0.5163	0.6811	0.5124	1.0	1.0	84.32
14	London	15	RF S2	0.5163	0.6951	0.5295	0.0	0.0	1458.65
15	London	28	RF B1	0.5163	0.6951	0.5295	0.0	0.0	1231.51
16	London	25	LR B1	0.5160	0.6808	0.5119	0.0	0.0	51.99
17	London	19	LGBM B1	0.5118	0.6921	0.5217	0.0	0.0	1278.48
18	London	26	WV-ONLINE	0.5042	0.6584	0.4892	0.0	0.0	536.18
19	London	10	DT S3	0.4534	0.5853	0.3696	6.0	5.0	98.58
20	London	9	DT S1	0.4534	0.5858	0.3708	14.0	5.0	89.98
21	London	21	DT B1	0.4429	0.5645	0.3440	0.0	0.0	38.39
22	London	18	DT S2	0.4411	0.5650	0.3425	0.0	0.0	53.19

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
23	London	24	LGBM B2	0.4333	0.5718	0.3819	0.0	0.0	1102.58
24	London	34	ARF	0.4319	0.7292	0.5698	0.0	0.0	383.62
25	London	29	DS-ONLINE	0.4317	0.7278	0.5685	0.0	0.0	587.02
26	London	27	SRP	0.4304	0.7092	0.5424	0.0	0.0	899.10
27	London	30	NB S1	0.4292	0.5202	0.3408	14.0	7.0	109.38
28	London	23	RF B2	0.4264	0.5672	0.3748	0.0	0.0	1072.53
29	London	22	LR B2	0.4248	0.5646	0.3717	0.0	0.0	49.88
30	London	32	NB S3	0.4236	0.5125	0.3323	6.0	4.0	132.09
31	London	35	NB S2	0.4194	0.5110	0.3305	0.0	0.0	78.13
32	London	36	NB B1	0.4194	0.5110	0.3305	0.0	0.0	52.06
33	London	20	DT B2	0.3840	0.4856	0.2695	0.0	0.0	37.40
34	London	37	ONB	0.3545	0.5518	0.3650	0.0	0.0	125.82
35	London	33	NB B2	0.3523	0.4226	0.2356	0.0	0.0	49.99
36	London	31	HAT	0.3385	0.5092	0.3168	0.0	0.0	319.72
37	London	38	OLR	0.0208	0.0319	0.0020	0.0	0.0	54.64
38	NHTS-MW	1	DS-RF	0.4760	0.7497	0.6402	107.0	59.0	84720.46
39	NHTS-MW	2	WV-RF	0.4577	0.7435	0.6284	107.0	59.0	67835.22
40	NHTS-MW	7	RF S1	0.4424	0.7299	0.6133	34.0	16.0	3796.36
41	NHTS-MW	8	LR S3	0.4237	0.5872	0.4435	11.0	10.0	1089.48
42	NHTS-MW	11	LR S1	0.4161	0.6145	0.4713	31.0	19.0	1420.77
43	NHTS-MW	9	DT S1	0.4105	0.7464	0.6559	32.0	20.0	601.91
44	NHTS-MW	10	DT S3	0.4036	0.7330	0.6374	11.0	9.0	281.73
45	NHTS-MW	15	RF S2	0.4027	0.7137	0.5873	10.0	9.0	3312.46
46	NHTS-MW	4	RF S3	0.4027	0.7137	0.5873	12.0	9.0	2548.20
47	NHTS-MW	17	LR S2	0.3858	0.5747	0.4308	7.0	7.0	818.72

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
48	NHTS-MW	3	DS-LGBM	0.3679	0.7605	0.6610	48.0	1.0	65638.91
49	NHTS-MW	5	DS-BATCH	0.3651	0.7533	0.6536	58.0	1.0	8220.94
50	NHTS-MW	6	WV-LGBM	0.3524	0.7537	0.6507	48.0	1.0	71879.20
51	NHTS-MW	16	LGBM S2	0.3487	0.7465	0.6433	2.0	0.0	585.15
52	NHTS-MW	14	LGBM S1	0.3487	0.7465	0.6433	17.0	0.0	2337.83
53	NHTS-MW	13	LGBM S3	0.3487	0.7465	0.6433	4.0	0.0	655.64
54	NHTS-MW	12	WV-BATCH	0.3487	0.7465	0.6433	58.0	1.0	8219.19
55	NHTS-MW	19	LGBM B1	0.3487	0.7465	0.6433	0.0	0.0	3390.72
56	NHTS-MW	20	DT B2	0.3255	0.6127	0.4939	0.0	0.0	233.86
57	NHTS-MW	21	DT B1	0.2952	0.6805	0.5657	0.0	0.0	329.61
58	NHTS-MW	18	DT S2	0.2948	0.6627	0.5416	0.0	0.0	203.15
59	NHTS-MW	22	LR B2	0.2719	0.3981	0.2659	0.0	0.0	717.05
60	NHTS-MW	23	RF B2	0.2320	0.5948	0.4415	0.0	0.0	2476.18
61	NHTS-MW	27	SRP	0.2097	0.7014	0.5672	0.0	0.0	70330.61
62	NHTS-MW	25	LR B1	0.2092	0.3503	0.2077	0.0	0.0	633.07
63	NHTS-MW	28	RF B1	0.1886	0.6073	0.4082	0.0	0.0	3061.13
64	NHTS-MW	24	LGBM B2	0.1177	0.3566	0.1949	0.0	0.0	2794.48
65	NHTS-MW	29	DS-ONLINE	0.0901	0.3852	0.1730	0.0	0.0	83130.95
66	NHTS-MW	31	HAT	0.0835	0.3012	0.1508	0.0	0.0	36687.71
67	NHTS-MW	26	WV-ONLINE	0.0814	0.4320	0.1386	0.0	0.0	84483.09
68	NHTS-MW	33	NB B2	0.0675	0.0947	0.0208	0.0	0.0	1076.56
69	NHTS-MW	35	NB S2	0.0611	0.1259	0.0301	3.0	0.0	918.80
70	NHTS-MW	32	NB S3	0.0611	0.1259	0.0301	5.0	0.0	1220.80
71	NHTS-MW	36	NB B1	0.0611	0.1259	0.0301	0.0	0.0	681.23
72	NHTS-MW	34	ARF	0.0561	0.4690	0.1121	0.0	0.0	2560.09
73	NHTS-MW	30	NB S1	0.0500	0.0999	0.0281	34.0	12.0	1357.63

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
74	NHTS-MW	37	ONB	0.0267	0.4159	-0.0000	0.0	0.0	23804.50
75	NHTS-MW	38	OLR	0.0128	0.0233	0.0107	0.0	0.0	1773.06
76	NHTS-NE	1	DS-RF	0.4641	0.7792	0.6832	112.0	59.0	87765.85
77	NHTS-NE	2	WV-RF	0.4599	0.7767	0.6777	112.0	59.0	87051.09
78	NHTS-NE	9	DT S1	0.4357	0.7775	0.6969	38.0	17.0	307.42
79	NHTS-NE	7	RF S1	0.4251	0.7543	0.6476	41.0	20.0	2732.06
80	NHTS-NE	11	LR S1	0.4207	0.6539	0.5242	37.0	18.0	669.07
81	NHTS-NE	10	DT S3	0.4162	0.7609	0.6738	16.0	8.0	290.92
82	NHTS-NE	4	RF S3	0.4142	0.7555	0.6488	16.0	9.0	2528.74
83	NHTS-NE	20	DT B2	0.4021	0.6584	0.5486	0.0	0.0	251.94
84	NHTS-NE	5	DS-BATCH	0.3787	0.7813	0.6948	64.0	2.0	7595.85
85	NHTS-NE	3	DS-LGBM	0.3770	0.7851	0.6982	53.0	2.0	65082.30
86	NHTS-NE	17	LR S2	0.3759	0.6412	0.5009	10.0	6.0	437.09
87	NHTS-NE	8	LR S3	0.3750	0.6415	0.5058	18.0	7.0	619.50
88	NHTS-NE	6	WV-LGBM	0.3588	0.7791	0.6888	53.0	2.0	61123.38
89	NHTS-NE	16	LGBM S2	0.3580	0.7750	0.6850	1.0	0.0	1388.38
90	NHTS-NE	14	LGBM S1	0.3580	0.7750	0.6850	27.0	0.0	3097.06
91	NHTS-NE	13	LGBM S3	0.3580	0.7750	0.6850	9.0	0.0	1126.49
92	NHTS-NE	12	WV-BATCH	0.3580	0.7750	0.6850	64.0	2.0	6545.09
93	NHTS-NE	19	LGBM B1	0.3580	0.7750	0.6850	0.0	0.0	3383.84
94	NHTS-NE	15	RF S2	0.3252	0.7225	0.5976	4.0	4.0	2353.08
95	NHTS-NE	18	DT S2	0.3092	0.7174	0.6153	0.0	0.0	141.83
96	NHTS-NE	21	DT B1	0.3089	0.7089	0.6031	0.0	0.0	345.22
97	NHTS-NE	23	RF B2	0.2787	0.6444	0.5067	0.0	0.0	2502.35
98	NHTS-NE	22	LR B2	0.2683	0.4299	0.2942	0.0	0.0	808.16

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
99	NHTS-NE	28	RF B1	0.2528	0.6730	0.5200	0.0	0.0	3169.13
100	NHTS-NE	27	SRP	0.2313	0.7322	0.6144	0.0	0.0	55738.82
101	NHTS-NE	25	LR B1	0.2028	0.4620	0.3152	0.0	0.0	714.31
102	NHTS-NE	24	LGBM B2	0.1666	0.5065	0.3584	0.0	0.0	3561.00
103	NHTS-NE	29	DS-ONLINE	0.0845	0.4079	0.1869	0.0	0.0	78882.46
104	NHTS-NE	31	HAT	0.0829	0.3189	0.1707	0.0	0.0	30021.90
105	NHTS-NE	26	WV-ONLINE	0.0772	0.4524	0.1551	0.0	0.0	76859.47
106	NHTS-NE	33	NB B2	0.0668	0.0839	0.0149	0.0	0.0	960.97
107	NHTS-NE	32	NB S3	0.0655	0.0867	0.0261	15.0	5.0	513.10
108	NHTS-NE	34	ARF	0.0614	0.4816	0.1269	0.0	0.0	1463.03
109	NHTS-NE	30	NB S1	0.0589	0.0866	0.0285	43.0	14.0	523.56
110	NHTS-NE	35	NB S2	0.0511	0.0811	0.0247	5.0	0.0	1560.00
111	NHTS-NE	36	NB B1	0.0511	0.0811	0.0247	0.0	0.0	788.83
112	NHTS-NE	37	ONB	0.0272	0.4279	-0.0000	0.0	0.0	23059.12
113	NHTS-NE	38	OLR	0.0117	0.0250	0.0135	0.0	0.0	1619.25
114	NHTS-SE	2	WV-RF	0.4557	0.7653	0.6543	168.0	85.0	118115.13
115	NHTS-SE	1	DS-RF	0.4530	0.7662	0.6586	168.0	85.0	118014.45
116	NHTS-SE	15	RF S2	0.4285	0.7432	0.6233	18.0	16.0	3600.94
117	NHTS-SE	4	RF S3	0.4285	0.7432	0.6233	23.0	16.0	3690.82
118	NHTS-SE	9	DT S1	0.4277	0.7641	0.6738	47.0	24.0	525.47
119	NHTS-SE	18	DT S2	0.4271	0.7564	0.6628	16.0	12.0	366.81
120	NHTS-SE	17	LR S2	0.4208	0.6426	0.4979	12.0	10.0	580.04
121	NHTS-SE	8	LR S3	0.4201	0.6400	0.4972	12.0	10.0	573.24
122	NHTS-SE	7	RF S1	0.4125	0.7389	0.6166	61.0	28.0	4028.50
123	NHTS-SE	10	DT S3	0.4061	0.7446	0.6465	12.0	7.0	427.95

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
124	NHTS-SE	11	LR S1	0.4012	0.6290	0.4866	55.0	28.0	998.26
125	NHTS-SE	6	WV-LGBM	0.3165	0.7544	0.6478	91.0	2.0	108938.05
126	NHTS-SE	3	DS-LGBM	0.3159	0.7522	0.6455	91.0	2.0	119122.05
127	NHTS-SE	20	DT B2	0.3151	0.6398	0.5197	0.0	0.0	591.60
128	NHTS-SE	16	LGBM S2	0.3141	0.7509	0.6446	2.0	0.0	476.56
129	NHTS-SE	13	LGBM S3	0.3141	0.7509	0.6446	7.0	0.0	996.73
130	NHTS-SE	12	WV-BATCH	0.3141	0.7509	0.6446	91.0	2.0	11946.93
131	NHTS-SE	19	LGBM B1	0.3141	0.7509	0.6446	0.0	0.0	4694.60
132	NHTS-SE	5	DS-BATCH	0.3135	0.7501	0.6436	91.0	2.0	11022.63
133	NHTS-SE	22	LR B2	0.2646	0.4001	0.2605	0.0	0.0	1315.21
134	NHTS-SE	21	DT B1	0.2400	0.6682	0.5370	0.0	0.0	315.66
135	NHTS-SE	23	RF B2	0.2200	0.6321	0.4746	0.0	0.0	4485.57
136	NHTS-SE	25	LR B1	0.2093	0.3930	0.2317	0.0	0.0	279.89
137	NHTS-SE	14	LGBM S1	0.2049	0.6460	0.5059	36.0	6.0	1240.84
138	NHTS-SE	27	SRP	0.1947	0.6935	0.5481	0.0	0.0	92934.53
139	NHTS-SE	28	RF B1	0.1670	0.6251	0.4237	0.0	0.0	4228.90
140	NHTS-SE	24	LGBM B2	0.1424	0.4900	0.3432	0.0	0.0	4700.93
141	NHTS-SE	29	DS-ONLINE	0.0775	0.3746	0.1400	0.0	0.0	124328.69
142	NHTS-SE	31	HAT	0.0691	0.2547	0.1085	0.0	0.0	51264.47
143	NHTS-SE	26	WV-ONLINE	0.0686	0.4416	0.1202	0.0	0.0	126428.51
144	NHTS-SE	33	NB B2	0.0675	0.0800	0.0151	0.0	0.0	1280.62
145	NHTS-SE	30	NB S1	0.0603	0.0885	0.0234	63.0	24.0	938.44
146	NHTS-SE	34	ARF	0.0514	0.4801	0.1063	0.0	0.0	2179.29
147	NHTS-SE	32	NB S3	0.0447	0.0763	0.0214	14.0	7.0	802.59
148	NHTS-SE	35	NB S2	0.0433	0.0745	0.0197	9.0	5.0	693.19
149	NHTS-SE	36	NB B1	0.0398	0.1059	0.0226	0.0	0.0	686.33

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
150	NHTS-SE	37	ONB	0.0274	0.4325	-0.0000	0.0	0.0	36869.95
151	NHTS-SE	38	OLR	0.0108	0.0154	0.0083	0.0	0.0	2448.38
152	NHTS-SW	1	DS-RF	0.4643	0.7807	0.6864	151.0	80.0	99704.80
153	NHTS-SW	2	WV-RF	0.4595	0.7790	0.6819	151.0	80.0	102847.74
154	NHTS-SW	4	RF S3	0.4211	0.7587	0.6553	21.0	14.0	3345.15
155	NHTS-SW	8	LR S3	0.4048	0.6290	0.4918	18.0	14.0	608.19
156	NHTS-SW	11	LR S1	0.4021	0.6386	0.5018	47.0	22.0	1398.39
157	NHTS-SW	9	DT S1	0.3939	0.7632	0.6747	54.0	25.0	433.37
158	NHTS-SW	7	RF S1	0.3920	0.7454	0.6343	54.0	26.0	3677.16
159	NHTS-SW	10	DT S3	0.3859	0.7514	0.6591	13.0	8.0	310.39
160	NHTS-SW	18	DT S2	0.3818	0.7484	0.6551	8.0	7.0	242.74
161	NHTS-SW	3	DS-LGBM	0.3584	0.7827	0.6970	93.0	19.0	85107.34
162	NHTS-SW	5	DS-BATCH	0.3574	0.7789	0.6934	93.0	19.0	7613.78
163	NHTS-SW	6	WV-LGBM	0.3568	0.7873	0.7012	93.0	19.0	104524.58
164	NHTS-SW	12	WV-BATCH	0.3557	0.7833	0.6984	93.0	19.0	7228.98
165	NHTS-SW	20	DT B2	0.3469	0.6540	0.5398	0.0	0.0	249.26
166	NHTS-SW	17	LR S2	0.3442	0.6132	0.4684	9.0	7.0	551.88
167	NHTS-SW	16	LGBM S2	0.3391	0.7721	0.6808	1.0	0.0	596.61
168	NHTS-SW	13	LGBM S3	0.3391	0.7721	0.6808	6.0	0.0	928.74
169	NHTS-SW	19	LGBM B1	0.3391	0.7721	0.6808	0.0	0.0	4628.27
170	NHTS-SW	14	LGBM S1	0.3364	0.7710	0.6793	38.0	1.0	5438.19
171	NHTS-SW	15	RF S2	0.2992	0.7069	0.5762	7.0	5.0	3343.71
172	NHTS-SW	22	LR B2	0.2783	0.5194	0.3395	0.0	0.0	1243.45
173	NHTS-SW	21	DT B1	0.2543	0.6982	0.5878	0.0	0.0	524.11
174	NHTS-SW	23	RF B2	0.2289	0.6303	0.4847	0.0	0.0	4704.03

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
175	NHTS-SW	28	RF B1	0.2110	0.6742	0.5250	0.0	0.0	4091.52
176	NHTS-SW	25	LR B1	0.2108	0.4252	0.2500	0.0	0.0	814.19
177	NHTS-SW	24	LGBM B2	0.1787	0.5422	0.3811	0.0	0.0	5410.17
178	NHTS-SW	27	SRP	0.1613	0.6864	0.5467	0.0	0.0	79355.50
179	NHTS-SW	29	DS-ONLINE	0.0803	0.4301	0.1710	0.0	0.0	109513.14
180	NHTS-SW	26	WV-ONLINE	0.0711	0.4591	0.1493	0.0	0.0	109645.59
181	NHTS-SW	31	HAT	0.0637	0.2021	0.0831	0.0	0.0	57760.73
182	NHTS-SW	34	ARF	0.0611	0.4957	0.1767	0.0	0.0	2899.39
183	NHTS-SW	35	NB S2	0.0565	0.0819	0.0279	9.0	4.0	727.22
184	NHTS-SW	30	NB S1	0.0554	0.0750	0.0270	58.0	25.0	691.29
185	NHTS-SW	32	NB S3	0.0534	0.0674	0.0267	17.0	9.0	639.35
186	NHTS-SW	36	NB B1	0.0506	0.0837	0.0285	0.0	0.0	937.72
187	NHTS-SW	33	NB B2	0.0470	0.0571	0.0185	0.0	0.0	704.75
188	NHTS-SW	37	ONB	0.0263	0.4074	-0.0000	0.0	0.0	38147.17
189	NHTS-SW	38	OLR	0.0114	0.0152	0.0083	0.0	0.0	3322.76
190	NHTS-W	10	DT S3	0.4848	0.7722	0.6836	28.0	14.0	566.05
191	NHTS-W	1	DS-RF	0.4532	0.7744	0.6654	187.0	96.0	143264.35
192	NHTS-W	9	DT S1	0.4527	0.7682	0.6780	50.0	25.0	594.09
193	NHTS-W	2	WV-RF	0.4353	0.7687	0.6537	187.0	96.0	141365.07
194	NHTS-W	15	RF S2	0.4173	0.7470	0.6217	20.0	17.0	4178.44
195	NHTS-W	4	RF S3	0.4173	0.7470	0.6217	30.0	17.0	4214.24
196	NHTS-W	11	LR S1	0.4115	0.6556	0.5178	47.0	29.0	897.65
197	NHTS-W	8	LR S3	0.4095	0.6627	0.5189	21.0	12.0	902.13
198	NHTS-W	7	RF S1	0.3808	0.7412	0.6121	66.0	34.0	4245.50
199	NHTS-W	17	LR S2	0.3802	0.6363	0.4906	9.0	6.0	628.01

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
200	NHTS-W	20	DT B2	0.3685	0.6631	0.5399	0.0	0.0	421.93
201	NHTS-W	18	DT S2	0.3432	0.6910	0.5743	0.0	0.0	198.67
202	NHTS-W	21	DT B1	0.3390	0.6877	0.5709	0.0	0.0	559.44
203	NHTS-W	5	DS-BATCH	0.3204	0.7635	0.6590	99.0	8.0	7590.45
204	NHTS-W	3	DS-LGBM	0.3200	0.7661	0.6615	99.0	8.0	123308.00
205	NHTS-W	14	LGBM S1	0.3175	0.7481	0.6406	36.0	4.0	2099.50
206	NHTS-W	12	WV-BATCH	0.3072	0.7589	0.6516	99.0	8.0	8258.08
207	NHTS-W	6	WV-LGBM	0.3064	0.7638	0.6556	99.0	8.0	110823.18
208	NHTS-W	16	LGBM S2	0.3024	0.7546	0.6454	3.0	0.0	976.63
209	NHTS-W	13	LGBM S3	0.3024	0.7546	0.6454	13.0	0.0	2646.26
210	NHTS-W	19	LGBM B1	0.3024	0.7546	0.6454	0.0	0.0	5477.02
211	NHTS-W	22	LR B2	0.2538	0.4007	0.2539	0.0	0.0	953.67
212	NHTS-W	27	SRP	0.2096	0.7146	0.5687	0.0	0.0	96165.77
213	NHTS-W	23	RF B2	0.1970	0.6438	0.4712	0.0	0.0	4565.17
214	NHTS-W	25	LR B1	0.1921	0.4242	0.2373	0.0	0.0	1291.27
215	NHTS-W	24	LGBM B2	0.1831	0.5814	0.4264	0.0	0.0	4757.49
216	NHTS-W	28	RF B1	0.1465	0.6215	0.3937	0.0	0.0	5196.77
217	NHTS-W	29	DS-ONLINE	0.0739	0.3853	0.1586	0.0	0.0	133554.11
218	NHTS-W	33	NB B2	0.0723	0.0575	0.0176	0.0	0.0	885.35
219	NHTS-W	31	HAT	0.0717	0.2745	0.1379	0.0	0.0	52504.42
220	NHTS-W	26	WV-ONLINE	0.0656	0.4623	0.1293	0.0	0.0	131808.03
221	NHTS-W	30	NB S1	0.0605	0.0861	0.0297	64.0	17.0	1177.87
222	NHTS-W	32	NB S3	0.0554	0.0774	0.0256	25.0	11.0	966.08
223	NHTS-W	35	NB S2	0.0552	0.0815	0.0266	13.0	7.0	887.78
224	NHTS-W	36	NB B1	0.0465	0.0752	0.0194	0.0	0.0	662.44
225	NHTS-W	34	ARF	0.0455	0.4828	0.0712	0.0	0.0	2759.94

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
226	NHTS-W	37	ONB	0.0284	0.4553	0.0000	0.0	0.0	33103.23
227	NHTS-W	38	OLR	0.0135	0.0327	0.0150	0.0	0.0	2684.69
228	NTS	6	WV-LGBM	0.5415	0.6787	0.4374	141.0	39.0	2601.83
229	NTS	5	DS-BATCH	0.5412	0.6642	0.4229	57.0	24.0	1314.61
230	NTS	3	DS-LGBM	0.5397	0.6655	0.4257	141.0	39.0	2706.23
231	NTS	12	WV-BATCH	0.5386	0.6658	0.4241	57.0	24.0	1192.17
232	NTS	2	WV-RF	0.5345	0.6782	0.4312	183.0	57.0	16451.08
233	NTS	14	LGBM S1	0.5343	0.6602	0.4141	54.0	16.0	354.19
234	NTS	1	DS-RF	0.5324	0.6673	0.4226	183.0	57.0	16392.98
235	NTS	13	LGBM S3	0.5299	0.6571	0.4087	25.0	11.0	313.80
236	NTS	7	RF S1	0.5260	0.6628	0.4108	53.0	15.0	4568.37
237	NTS	4	RF S3	0.5202	0.6587	0.4056	25.0	7.0	3900.09
238	NTS	16	LGBM S2	0.5107	0.6465	0.3880	2.0	2.0	281.23
239	NTS	24	LGBM B2	0.5059	0.6253	0.3754	0.0	0.0	3280.94
240	NTS	15	RF S2	0.4916	0.6415	0.3790	2.0	2.0	4200.99
241	NTS	23	RF B2	0.4855	0.6218	0.3626	0.0	0.0	4014.39
242	NTS	8	LR S3	0.4813	0.6437	0.3724	25.0	12.0	225.38
243	NTS	26	WV-ONLINE	0.4806	0.6393	0.3673	0.0	0.0	1184.56
244	NTS	11	LR S1	0.4668	0.6357	0.3539	53.0	24.0	267.63
245	NTS	17	LR S2	0.4547	0.6362	0.3639	2.0	1.0	166.85
246	NTS	22	LR B2	0.4403	0.6026	0.3220	0.0	0.0	143.17
247	NTS	32	NB S3	0.4280	0.5330	0.2650	24.0	9.0	213.61
248	NTS	10	DT S3	0.4236	0.5380	0.2513	24.0	11.0	167.05
249	NTS	9	DT S1	0.4235	0.5360	0.2513	53.0	23.0	207.70
250	NTS	30	NB S1	0.4233	0.5268	0.2572	52.0	15.0	270.74

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
251	NTS	20	DT B2	0.4104	0.5138	0.2319	0.0	0.0	105.36
252	NTS	33	NB B2	0.4072	0.5040	0.2351	0.0	0.0	155.73
253	NTS	29	DS-ONLINE	0.3751	0.6511	0.3742	0.0	0.0	1313.52
254	NTS	27	SRP	0.3748	0.6486	0.3625	0.0	0.0	1091.14
255	NTS	34	ARF	0.3727	0.6766	0.3961	0.0	0.0	1152.61
256	NTS	35	NB S2	0.3643	0.4481	0.2106	0.0	0.0	176.59
257	NTS	36	NB B1	0.3643	0.4481	0.2106	0.0	0.0	147.09
258	NTS	25	LR B1	0.3633	0.6037	0.2988	0.0	0.0	132.41
259	NTS	28	RF B1	0.3555	0.5957	0.2969	0.0	0.0	4155.82
260	NTS	19	LGBM B1	0.3552	0.5817	0.2852	0.0	0.0	4552.39
261	NTS	21	DT B1	0.3492	0.4916	0.1784	0.0	0.0	141.69
262	NTS	18	DT S2	0.3488	0.4899	0.1753	0.0	0.0	123.73
263	NTS	37	ONB	0.3477	0.5436	0.2793	0.0	0.0	153.35
264	NTS	31	HAT	0.2724	0.4438	0.1682	0.0	0.0	473.12
265	NTS	38	OLR	0.1799	0.5534	0.0026	0.0	0.0	80.24
266	Ohio	5	DS-BATCH	0.2242	0.8724	0.6808	50.0	8.0	1074.72
267	Ohio	3	DS-LGBM	0.2239	0.8728	0.6824	94.0	9.0	7419.69
268	Ohio	14	LGBM S1	0.2173	0.8674	0.6678	34.0	2.0	1732.27
269	Ohio	10	DT S3	0.2164	0.8233	0.5893	13.0	9.0	1722.45
270	Ohio	12	WV-BATCH	0.2156	0.8686	0.6684	50.0	8.0	1004.59
271	Ohio	6	WV-LGBM	0.2146	0.8707	0.6685	94.0	9.0	7295.75
272	Ohio	9	DT S1	0.2138	0.8192	0.5756	34.0	17.0	1782.37
273	Ohio	16	LGBM S2	0.2130	0.8664	0.6623	4.0	0.0	193.32
274	Ohio	13	LGBM S3	0.2130	0.8664	0.6623	15.0	0.0	1501.06
275	Ohio	19	LGBM B1	0.2130	0.8664	0.6623	0.0	0.0	2354.07

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
276	Ohio	8	LR S3	0.2068	0.8412	0.6110	12.0	7.0	1726.50
277	Ohio	1	DS-RF	0.2059	0.8712	0.6601	124.0	52.0	16161.06
278	Ohio	18	DT S2	0.2051	0.8179	0.5756	3.0	2.0	111.39
279	Ohio	4	RF S3	0.2051	0.8706	0.6581	16.0	7.0	4002.08
280	Ohio	11	LR S1	0.2021	0.8376	0.6024	36.0	17.0	1992.12
281	Ohio	22	LR B2	0.2014	0.8155	0.5206	0.0	0.0	99.06
282	Ohio	7	RF S1	0.2002	0.8659	0.6421	38.0	18.0	4093.52
283	Ohio	21	DT B1	0.1975	0.8189	0.5752	0.0	0.0	81.40
284	Ohio	2	WV-RF	0.1970	0.8658	0.6390	124.0	52.0	15978.95
285	Ohio	23	RF B2	0.1961	0.8478	0.5767	0.0	0.0	1841.63
286	Ohio	17	LR S2	0.1877	0.8159	0.5585	3.0	2.0	153.50
287	Ohio	20	DT B2	0.1873	0.7963	0.5039	0.0	0.0	73.81
288	Ohio	15	RF S2	0.1871	0.8600	0.6269	5.0	5.0	2372.49
289	Ohio	27	SRP	0.1771	0.8658	0.6481	0.0	0.0	4149.69
290	Ohio	25	LR B1	0.1756	0.7879	0.4946	0.0	0.0	104.80
291	Ohio	26	WV-ONLINE	0.1660	0.8439	0.5689	0.0	0.0	2411.53
292	Ohio	28	RF B1	0.1636	0.8503	0.5969	0.0	0.0	2262.79
293	Ohio	29	DS-ONLINE	0.1619	0.8465	0.5773	0.0	0.0	2506.60
294	Ohio	24	LGBM B2	0.1616	0.7557	0.4283	0.0	0.0	1925.58
295	Ohio	34	ARF	0.1573	0.8483	0.5806	0.0	0.0	722.21
296	Ohio	38	OLR	0.1217	0.7947	0.4823	0.0	0.0	176.67
297	Ohio	37	ONB	0.1131	0.8156	0.4839	0.0	0.0	1170.22
298	Ohio	31	HAT	0.0780	0.3376	0.1058	0.0	0.0	1858.16
299	Ohio	33	NB B2	0.0711	0.3344	0.0759	0.0	0.0	141.96
300	Ohio	35	NB S2	0.0629	0.2798	0.0848	7.0	2.0	200.55
301	Ohio	32	NB S3	0.0629	0.2798	0.0848	18.0	2.0	1951.37

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
302	Ohio	30	NB S1	0.0629	0.2798	0.0848	42.0	2.0	2091.38
303	Ohio	36	NB B1	0.0598	0.3172	0.0886	0.0	0.0	161.69
304	Optima	12	WV-BATCH	0.4590	0.6110	0.3013	117.0	22.0	2541.97
305	Optima	13	LGBM S3	0.4533	0.5894	0.2905	17.0	4.0	717.30
306	Optima	5	DS-BATCH	0.4461	0.5700	0.2606	117.0	22.0	2548.02
307	Optima	6	WV-LGBM	0.4384	0.6547	0.3379	117.0	22.0	8179.01
308	Optima	3	DS-LGBM	0.4365	0.6013	0.2922	117.0	22.0	2684.22
309	Optima	16	LGBM S2	0.4286	0.5603	0.2460	51.0	8.0	926.28
310	Optima	14	LGBM S1	0.4283	0.5603	0.2460	17.0	7.0	12.04
311	Optima	18	DT S2	0.3943	0.5082	0.2047	47.0	10.0	978.93
312	Optima	1	DS-RF	0.3933	0.5978	0.2797	112.0	29.0	2997.41
313	Optima	15	RF S2	0.3915	0.5974	0.2547	49.0	8.0	1019.55
314	Optima	7	RF S1	0.3835	0.5947	0.2527	13.0	9.0	45.91
315	Optima	4	RF S3	0.3823	0.5907	0.2264	15.0	4.0	784.60
316	Optima	8	LR S3	0.3724	0.5395	0.2296	18.0	5.0	756.07
317	Optima	2	WV-RF	0.3617	0.6340	0.2725	112.0	29.0	3000.15
318	Optima	10	DT S3	0.3539	0.4627	0.1647	18.0	3.0	751.16
319	Optima	9	DT S1	0.3537	0.4693	0.1478	13.0	7.0	9.89
320	Optima	11	LR S1	0.3413	0.5139	0.1734	14.0	10.0	13.09
321	Optima	26	WV-ONLINE	0.3384	0.6137	0.2360	0.0	0.0	90.86
322	Optima	17	LR S2	0.3293	0.5161	0.1579	47.0	16.0	974.94
323	Optima	30	NB S1	0.3139	0.4830	0.1445	17.0	7.0	10.76
324	Optima	29	DS-ONLINE	0.3115	0.5700	0.2972	0.0	0.0	70.54
325	Optima	19	LGBM B1	0.3070	0.5143	0.0843	0.0	0.0	34.98
326	Optima	31	HAT	0.3057	0.5492	0.2784	0.0	0.0	43.67

	Data stream	Global rank pos.	Method abbr.	F_1 macro	Accuracy	Kappa	Drift count	Replacement count	Time [s]
327	Optima	21	DT B1	0.3048	0.4344	0.0974	0.0	0.0	2.67
328	Optima	35	NB S2	0.3030	0.4728	0.1141	50.0	11.0	974.51
329	Optima	22	LR B2	0.3002	0.4552	0.1467	0.0	0.0	2.15
330	Optima	24	LGBM B2	0.2989	0.5042	0.1263	0.0	0.0	31.50
331	Optima	32	NB S3	0.2929	0.4464	0.0892	14.0	3.0	750.43
332	Optima	25	LR B1	0.2911	0.4949	0.1185	0.0	0.0	2.86
333	Optima	20	DT B2	0.2813	0.4026	0.0965	0.0	0.0	2.17
334	Optima	23	RF B2	0.2739	0.5064	0.0941	0.0	0.0	29.85
335	Optima	37	ONB	0.2643	0.6137	0.2252	0.0	0.0	20.02
336	Optima	33	NB B2	0.2622	0.4358	0.0686	0.0	0.0	2.10
337	Optima	27	SRP	0.2340	0.5907	0.1727	0.0	0.0	135.40
338	Optima	36	NB B1	0.2161	0.4680	-0.0100	0.0	0.0	2.54
339	Optima	28	RF B1	0.1991	0.5143	-0.0218	0.0	0.0	33.54
340	Optima	34	ARF	0.1883	0.5691	0.0677	0.0	0.0	15.12
341	Optima	38	OLR	0.1495	0.2512	0.0251	0.0	0.0	7.01

Figure 1: Visualization of F_1 macro score for selected methods.